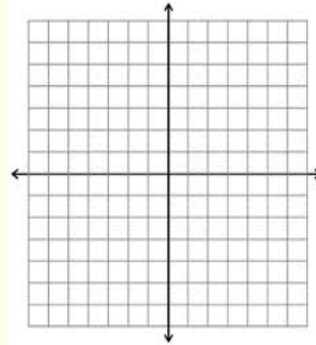
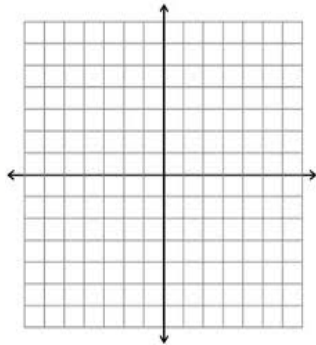


Warm Up # 5-1

For each function, describe the transformations of the parent graph, $f(x) = 2^x$, accurately sketch the graph, label the asymptote with its equation and state the domain and range.

1. $y = 2^{x+4} - 3$

2. $y = -2^x + 2$



HW Questions: p. 330

- 3 The trunk widths and heights of the trees in a garden were recorded:

Trunk width (x cm)	35	47	72	40	15	87	20	66	57	24	32
Height (y m)	11	18	24	12	3	30	22	21	17	5	10

- Draw a scatter diagram of the data.
- Which of the points is an outlier?
- How would you describe the tree represented by the outlier?
- Calculate the mean point (\bar{x}, \bar{y}) .
- Plot the mean point on the scatter diagram, and draw a line of best fit through the mean point.
- Predict the height of a tree with trunk width 120 cm. Comment on the reliability of your prediction.



EXERCISE 11D

- 1 A newspaper reports starting salaries for recently graduated university students which depend on whether they hold a Bachelor degree or a PhD.

- a Draw a scatter diagram for the data.
- b Determine r .
- c Describe the association between *starting salaries for Bachelor degrees* and *starting salaries for PhDs*.
- d Find the equation of the line of best fit.
- e The starting salary for an economist with a Bachelor degree is \$40 000.
 - i Predict the starting salary for an economist with a PhD.
 - ii Comment on the reliability of your prediction.

<i>Field</i>	<i>Bachelor degree (\$x)</i>	<i>PhD (\$y)</i>
Chemical engineer	38 250	48 750
Computer coder	41 750	68 270
Electrical engineer	38 250	56 750
Sociologist	32 750	38 300
Applied mathematician	43 000	72 600
Accountant	38 550	46 000

- 3 The table below shows the price of petrol and the number of customers per hour for sixteen petrol stations.

<i>Petrol price (x cents per litre)</i>	105.9	106.9	109.9	104.5	104.9	111.9	110.5	112.9
<i>Number of customers (y)</i>	45	42	25	48	43	15	19	10

<i>Petrol price (x cents per litre)</i>	107.5	108.0	104.9	102.9	110.9	106.9	105.5	109.5
<i>Number of customers (y)</i>	30	23	42	50	12	24	32	17

- a Calculate r for the data.
- b Describe the relationship between the *petrol price* and the *number of customers*.
- c Use technology to find the line of best fit.
- d Interpret the gradient of this line.
- e Estimate the number of customers per hour for a petrol station which sells petrol at 115.9 cents per litre.
- f Comment on the validity of your estimate in e.

Review of Exponential Functions: $y = ab^x$

Exponential Growth when $b > 1$

Exponential Decay when $0 < b < 1$

What if $b = 1$? $y = a(1)^x$ Horizontal Line!

If $a > 1$, then vertically stretched

If $0 < a < 1$, then vertically compressed

(If $a < 0$, there has been a reflection in the x-axis and the function is not called Exponential Growth or Decay)

Find the equation for the exponential function through the given points:

$$y = ab^x; b > 0$$

1. $(0, 0.5)$ & $(2, 8)$

$$0.5 = ab^0$$

$$0.5 = a$$

$$y = 0.5(b)^x$$

$$8 = 0.5b^2$$

$$\sqrt[2]{16} = \sqrt[2]{b^2}$$

$$b = 4$$

$$y = 0.5(4)^x$$

2. $(2, 18)$ & $(3, 54)$

$$18 = ab^2$$

$$\frac{18}{9} = \frac{a(3)^2}{9} \quad \frac{54}{18} = \frac{ab^3}{ab^2}$$

$$3 = b$$

$$a = 2$$

$$y = 2(3)^x$$

3. $(2, 0.75)$ & $(-3, 24)$

$$\frac{0.75}{24} = \frac{ab^2}{ab^{-3}} \quad 24 = ab^{-3}$$

$$\sqrt[5]{0.03125} = \sqrt[5]{b^5}$$

$$b = 0.5$$

$$\frac{0.75}{0.25} = \frac{a(0.5)^2}{0.25}$$

$$a = 3$$

$$y = 3(0.5)^x$$

4. $(1, \frac{36}{5})$ & $(-2, \frac{25}{6})$

(use fractions)

$$\frac{6}{25} \cdot \frac{36}{5} = \frac{ab^1}{ab^{-2}} \quad \frac{25}{6} = ab^{-2}$$

$$\frac{216}{125} = b^3$$

$$b = \frac{6}{5}$$

$$\frac{5}{6} \cdot \frac{36}{5} = a\left(\frac{6}{5}\right)^1 \cdot \frac{5}{6}$$

$$6 = a$$

$$y = 6\left(\frac{6}{5}\right)^x$$

5. Evaluate the function for #4 when $x = 3$.

Answer as a fraction.

$$y = 6\left(\frac{6}{5}\right)^3$$

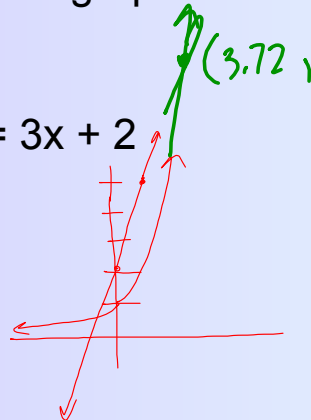
$$y = 6\left(\frac{216}{125}\right)$$

$$y = \frac{1296}{125}$$

Solve with grapher:

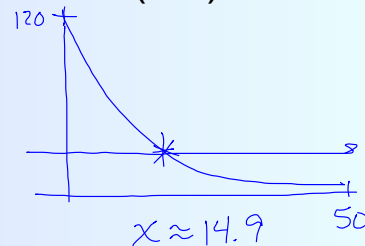
$$y = 120(0.9)^x \quad y = 25$$

1. $2^x = 3x + 2$



$$x \approx 3.72 \quad x \approx -0.417$$

2. $120(0.9)^x = 25$



$$x \approx 14.9$$

HW: p. 541

Rev. Set 18A, # 2, 3, 5

Rev. Set 18B, #3 - 5